

# BIBLIOGRAPHIC DATA SHEET

(See instructions on the reverse)

1. REPORT NUMBER  
(Assigned by NRC, Add Vol., Subj., Rev.,  
and Accession Numbers, if any.)

NRC 2487

2. TITLE AND SUBTITLE

IMPACT OF SOCIAL AND PSYCHOLOGICAL FACTORS  
ON NUCLEAR POWER PLANT OPERATOR PERFORMANCE

3. DATE REPORT PUBLISHED

MONTH	YEAR
MARCH	1991

4. FUND OR GRANT NUMBER

5. AUTHOR(S)

Sergei Zakharenkov

6. TYPE OF REPORT

TRANSLATION

7. PERIOD COVERED (Inclusive Dates)

8. PERFORMING ORGANIZATION - NAME AND ADDRESS (If NRC, provide Division, Office or Region, U.S. Nuclear Regulatory Commission, and mailing address; if contractor, provide name and mailing address.)

SCITRAN COMPANY  
1482 EAST VALLEY ROAD  
SANTA BARBARA, CALIFORNIA 93150  
(805) 969-2413

9. SPONSORING ORGANIZATION - NAME AND ADDRESS (If NRC, type "Same as above"; if contractor, provide NRC Division, Office or Region, U.S. Nuclear Regulatory Commission, and mailing address.)

10. SUPPLEMENTARY NOTES

11. ABSTRACT (200 words or less)

This report presents the results of examining operation of a nuclear power plant. It determines the social factors at work in defining interpersonal relationships and their impact on the climate at the plant. Through questionnaires it looks at personality characteristics that are influential in the work groups and in determining leadership. It is found that the majority of workers were satisfied with their work at the nuclear plant and that there is a high educational potential making it possible to solve complicated problems. However, it is found that scheduling of work and distribution of duties is not effective. The report draws up conclusions and recommendations for the nuclear power plant administration to improve the social and psychological climate.

12. KEY WORDS/DESCRIPTORS (List words or phrases that will assist researchers in locating the report.)

13. AVAILABILITY STATEMENT

14. SECURITY CLASSIFICATION

(This Page)

(This Report)

UNCLASSIFIED

15. NUMBER OF PAGES

29

16. PRICE

9104100285 910301  
PDR REVGP NRQUSUR  
PDR

DFA 3  
0/1

IMPACT OF SOCIAL AND PSYCHOLOGICAL FACTORS ON NUCLEAR  
POWER PLANT OPERATOR PERFORMANCE

The role of the human factor in nuclear power is very great: at stages of designing, operation, repair and use, the participation of the worker everywhere has a decisive impact on the final result. /1\*

Until a certain time not only in nuclear power, but also in any other sector of the USSR national economy there was no single system for working out psychological methods in working with the personnel. Work on this question as of old was "by eye" with orientation only on acquired personal experience and could and does lead to repetition of errors. Therefore throughout the world interest in the human factor rises with the significance and "central nature" of man's role in the production and social spheres.

More attention in the activity of the operating organization has recently been given to the impact of social and psychological factors on NPP\*\* personnel performance, in particular operators. The results of this work have the following purposes:

- eliminate unfavorable factors on error-free activity of the operators,
- introduce corrective measures into the system of selection and training of personnel and completion of the shift groups,
- improve operating documents and production structures for control of the production process,
- improve ergonomic characteristics of the layout designs adopted in the project,
- introduce corrective measures influencing labor satisfaction (moral and material stimulation),
- introduce corrective measures of a social nature and so forth.

---

\*Numbers in margin indicate pagination in original foreign text.  
\*\*nuclear power plant

In order to solve these problems the sector has created a specialized center Prognoz which provides methodological and practical supervision of sectors of social development at the NPP, laboratories of psychological and physiological selection and training of personnel in training centers, and also conducts independent studies with trips to nuclear power plants.

The subject of this report is the results of an investigation conducted by assignment of the operating organization at one of the NPP. We will conditionally call it the Balakovo NPP.

Study of the Impact of Social and Psychological Climate on Performance Efficiency of the NPP and Preparation of Recommendations /2

1. Tasks of study.

1.1. Check out of method tools for studying SPC (social and psychological climate).

1.2. Detection of social factors significant for formation of SPC in plant groups.

1.3. Determination of the nature of interpersonal interrelationships and their impact on SPC.

1.4. Determination of the level of business and personality qualities of the leaders (heads of sections and shops).

1.5. Development of recommendations for optimizing SPC.

2. Theoretical premises of study.

2.1. Psychological theory of activity.

2.2. Psychological theory of joint activity of groups of people.

2.3. Theory of public opinion.

3. Objects of study.

3.1. Operating personnel of subdivisions (TsTAL, ETs, TTs, RTs, KhTs).

3.2. Operational personnel of shifts servicing TsShchU and BShchU of the BNPP.

4. Subject of study.

4.1. System of factors comprising SPC in plant groups.

5. Technique of study.

5.1. Conversations with workers of BNPP on problems related to status of SPC of groups.

5.2. Questionnaire.

5.3. Technique of studying closeness of groups.

5.4. Expert evaluation of business and personality qualities.

6. Results of study at BNPP and their analysis.

6.1. Social and psychological climate in subdivisions of BNPP is fairly complicated and contradictory. In each subdivision the climate is characterized by its own parameters, however as a whole the main factors are common. All, insofar as in the sphere of cause and effect relationships (objective and subjective) all subdivisions are involved in one way or another. /3

This is the formed system of control of nuclear plants (sector and intraplant), which in turn is related to the specific nature of the national economic mechanism, and the cautious attitude to nuclear plants as a whole throughout the country, and in particular in the city of Balakovo, and strict cadre competition with other enterprises of the city, rapid growth of the NPP group influencing its closeness and comparative young age of the plant workers (the mean age is 21), as well as relatively high educational level which influences the duty, rank and personality relationships.

6.2. Satisfaction with work.

Satisfaction with work is a generalizing criterion of the social and psychological climate. As indicated by the study results, 65% of those questioned were completely or mainly satisfied with work at the NPP, 61% in the subdivision (shop, laboratory, section), and 71% at a specific work section. The dissatisfied were respectively 17, 19 and 16%. Others had difficulty in expressing their attitude to labor satisfaction. The correlation of "satisfaction-dissatisfaction" which is favorable as a whole does not mean complete well-being and cannot be the reason for ignoring those negative aspects which were revealed during the study.

### 6.3. Labor organization.

The social and psychological climate and labor satisfaction are intimately related to labor organization of the subdivisions. Forty-eight percent of those questioned were completely or mainly satisfied with it, while at the same time 35% believed that labor organization does not permit full application of their knowledge and professional habits. They primarily demand an improvement in planning and distribution of duties (the opinion of 42% of those questioned), system of improving qualification of workers (52%), quality of tools, equipment and operating documents (53%) and interaction between plant subdivisions (38%). This does not simply refer to fragmentary changes in labor organization, but a qualitatively new approach to solving the aforementioned problems.

### 6.4. Improving qualification.

Fifty-eight percent of the respondents believe that in order to improve this system of qualification of workers closer correlation of professional growth with the system of wages is necessary, increase in the quantity of exercises in technical studies, more active help to novices on the part of experienced workers, as well

/4

as active personal work for each to improve their qualification. The latter must be especially stressed insofar as not everything can be organized from the outside. No matter how well thought out the system of improving qualification is, it cannot be properly effective without subjective striving towards professional perfection. At the same time, only 40% of those questioned constantly or as possible in their free time work with the technical documents and special literature, the others refer to it extremely rarely or not at all.

#### 6.5. Personnel load.

Lack of perfection in labor organization is also manifest in nonuniform load and labor intensity both of individual categories of workers and of the structural subdivisions. In particular, the laboratory personnel in the opinion of almost half of those questioned are not sufficiently loaded. Labor intensity of the leaders is incomparable to the load of the executors. Nonnormed work day, daily reprocessings, (including on off days) all of this on the one hand indicates the high level of responsibility and discipline of the leaders, and on the other hand imperfection of labor organization. However it should be noted that the leadership of the BNPP is currently taking measures to alter the existing situation: in the near future an experiment will be conducted to isolate a cost-accounting unit, a monoblock (this concerns economic influence on labor organization), a new structure is being developed for control of the NPP with involvement in this work of plant sociologists insuring scientific method substantiation for this work.

#### 6.6. Wages.

One of the most important factors influencing SPC is wages. Forty-one percent were satisfied with them, 37% considered them

lower than their real labor contribution, 13% of those questioned honestly claimed that they are receiving more than they actually earn. These numbers cannot be absolute reference points since we have to take into consideration the mildly oscillating settings on "wage leveling" and on obtaining, and not on earning money. Apparently we should expect the emergence of strain in the SPC of the group because of changes in the economic mechanism of the country, which naturally also affects the plant group, but introduction of differentiated wages is a necessary step. /5

#### 6.7. Settings for work.

In speaking about wages, one should note, however that the majority of workers in their responses focused not only on earning money. Only 10% believe that any work is good if only it is well paid for. Forty-two percent of the respondents say that it is impossible to forget about wages, but primary in work is its meaning and its social significance.

Twenty-three percent expressed the opinion that "that work is good where you are providing benefit, where you are needed." It follows from this that economic levers are far from the only ones. This should be especially recalled as applied to the future new economic methods of management. Under these conditions it will be impossible to forget about the moral factors of labor. Fifty-six percent of those questioned at the ENPP believe themselves to be responsible for shortcomings in the performance of the subdivision. This feeling of responsibility comes not from material, but spiritual and moral spheres.

6.8. Discipline. We will now discuss the impact of discipline on the moral and psychological climate. On the one hand this means the set of measures taken by different managerial structures, on

the other hand it is the natural internal self-organization of the group. Both of these factors must be viewed in mutual relationship.

In the opinion of 69% of the respondents detection and strict dealing with violators are fairly effective. At the same time 35% evaluate the insufficiency of preventive work with violators, 21% consider it insufficiently effective from the viewpoint of ensuring labor discipline, selection and placement of the cadres, i.e.,

the accent on the punishment part of ensuring labor discipline which is traditional for management systems of Soviet industrial enterprises is once more confirmed. However it is impossible to currently completely exclude it both because of the specific nature of the enterprise, and because of the insufficient level of self-organization of groups in which there are noticeable moods of condescension and indifference towards workers who violate the production technology (the opinion of 33% of those questioned), to workers who violate the labor and social discipline (32%), and towards workers who disrupt the planned assignments and decisions (opinion of 25%).

#### 6.9. Information content.

16

The dependence of the social and psychological climate on the information content is generally known and does not require special proof. The results of questioning on this topic are presented in the following table.

TABLE 1.

	1	2	3	4	5
	Completely	Informed	Partially	Insuffi-	Uninformed
				ciently	

Outlook for operation of the plant under conditions of cost accounting	2%		11%	49%	27%
--	----	--	-----	-----	-----

(Table continued next page)

TABLE 1. Continued:

Outlook for operation of shop subdivisions onto conditions of cost accounting	3%	9%	45%	34%
Personnel questions (selection, advance in service, certification, firing from job)	11%	14%	41%	24%
Condition of discipline	37%	29%	19%	4%
Distribution of goods of elevated demand	4%	18%	43%	28%
Distribution of housing	13%	35%	33%	12%

The data cited in the table indicate the insufficient information content of the workers on very important questions of production and daily nature.

This especially concerns the outlook for operation of the plant and subdivisions under conditions of cost accounting, personnel questions and distribution of goods of elevated demands. The groups are more informed about the condition of discipline. This is natural since questions of discipline are included in the daily production cycle and voluntarily or involuntarily are the object of everyone's attention. However it should be stipulated that this does not concern only insufficiently initiative organization of the direction of information to the subdivisions. In principle this information is available in the form of documents, publications in the newspaper and so forth. But the attempt of the workers themselves to get this information and to study it is insufficient.

#### 6.10. Decision making

On the whole one can assert that the correlation of democratic and command methods of decision making is the optimal. There is /7

focus on "command", but for NPP conditions this could be considered normal. Thirty-two percent of those questioned assert that some of the questions are brought out at meetings, some are solved by the subdivision leadership, and 44% believe that the decisions are most often made by the supervisor. In the opinion of those questioned, a broad group of workers should be involved in solving questions of forming the reserve of cadres for advance (in the opinion of 33% of those questioned), preparation of transition to cost accounting (31%) and improvement in labor organization (36%). It should be noted that definite steps in this direction are being made and new forms of decision making are being introduced with preliminary expert development of them (in particular, the sociological service of the BNPP by special technique worked with experts to prepare a decision about change in the structure of plant control, and formed a reserve for the duty of director, chief engineer, heads of sections and shops with regard for public opinion).

#### 6.11. Interrelationships in the groups.

The attitude of people towards each other in the production group is formed first of all by psychological directions and value orientations in contact both production and nonproduction, and of their action and specific acts of contact. Therefore analysis of interrelationships should include both of these aspects. Eight percent of those questioned believe that interrelationships between people during work must be based only on personality qualities, 11% only on business, 12% believe that they must be based to a greater degree on personality than on business, and 28% to a greater degree on business than on personality.

Forty-one percent of those questioned believe that interrelationships must be formed from recognition of both business and personality qualities. In the groups there is the opportunity for

implementation of these, on the whole favorable directions for mutual positive contact;  
63% negate the presence of frequent disputes;  
74% of the respondents assert that in the groups there are friendly interrelationships;  
64% indicate clarity and definiteness of the interrelationships with work colleagues;  
59% do not believe that there are many unpleasant people in the group.

Nevertheless the aforementioned positive aspects have a shade of a certain superficiality and insufficient strength. This is because the groups are comparatively young and their internal relationships have not been tested by time. /8

#### 6.12. Closeness.

##### 6.12.1. Operating and auxiliary personnel.

As shown by analysis of the sociometric studies, closeness of the groups of operating personnel leaves much to be desired. On the sociometric scale they fluctuate from 0.13 towards increase, but do not exceed 0.35.

Clarification: the index of closeness is calculated by the formula  $V = \frac{\xi(+)-\xi(-)}{n(n-1)}$  where  $\xi(+)$  is the sum of mutual positive selections,  $\xi(-)$  is the sum of mutual negative selections,  $n$  is the number of members of the group. The range of the scale of closeness is in the interval from -1 to +1. The group can be considered close if its index is no less than 0.5. The index of closeness of the group is computed from personal sociometric indexes of the workers. Personal indexes make it possible to isolate groups of leaders

((workers that are most often preferred by others) and the risk group (those most often rejected by the other workers)).

TABLE 2.

Subdivisions of NPP (number)	Coefficient of Closeness	Number of Leaders	Number of Rejectees
LM-44 people	0.13	9	4
RZA ETs 58 people	0.28	11	4
KIP Ts TAI 65 people	0.25	7	7
SVRK Ts TAI 22 people	0.35	5	2
TZBK Ts TAI 44 people	0.29	7	3
SUZ Ts TAI 44 people	0.35	13	5
OPS UKS 15 people	0.30	5	4

None of the subdivisions cited in the table can yet be considered optimally close. The laboratories of SUZ and SVRK of the TAI shop are the most favorable in this respect, while the laboratory of metals (LM) is comparatively unfavorable.

#### 6.12.2. Operating personnel

We should dwell separately on studying the closeness and compatibility of the personnel. This question is the most important since the stability of the plant operation primarily depends on the work of the operators.

/ 9

Study of closeness of the operating personnel was conducted by another sociometric technique which is a modification of the technique cited above.

In addition the technique of completing the labor group of the NPP developed in the regional scientific research laboratory Prognoz was used.

The technique makes it possible to form groups of shifts based on mutual preference, i.e., to determine mutual positive and negative selections of the shift workers. As a result of the study the following data were obtained:

the number of mutual positive selections for the entire sampling (shift personnel) is 89;

the number of mutual negative selections for the entire sampling (shift personnel) is 12;

the number of mutual positive selections by shifts:

shift A	25
shift B	9
shift C	17
shift D	9
shift E	6

The coefficient of closeness for the entire sampling (shift personnel) is 0.03. The coefficient of closeness by shifts:

shift A	0.2
shift B	0.08
shift C	0.16
shift D	0.08
shift E	0.06

Analysis of the findings demonstrated that shift A (HPS--Yu. V. Svezhentsev) is distinguished by the greatest closeness. The lead of shift A Yu. V. Svezhentsev is the most preferable among all the workers of operating personnel. Positive personal quality and high professionalism are primarily noted as the reasons for the selection.

Among workers of shift A there were the greatest number of mutual selections (25) and the operators of this shift have especial authority.

There is a fairly high level of closeness in shift C (HPS--V. P. Solyar). This is confirmed by the fact that within the group of shift C a considerable number (17) of mutual selections was made.

The level of closeness and the number of mutual selections in shifts B (HPS--V. I. Plotnikov) and D (HPS--S. I. Mamakov) were the same. /10  
At the same time the greatest number of mutual selections is made by the operators of these shifts not with their own colleagues in the shift, but with workers of other shifts (especially in shift D).

The authority of the head of the plant shift (HPS) V. M. Plotnikov is evident; according to the results of the questionnaire he is one of the most preferable among all the HPS. V. I. Plotnikov is isolated for professional training and psychological compatibility.

Shift E (HPS--Y. I. Terekhov) is distinguished significantly from all the other shifts. The coefficient of closeness of shift E is the lowest (0.06). None of the workers in shift E is included in the group of leaders. The workers of this shift got the greatest number of rejects. The number of mutual preferences between the colleagues in shift E among all shifts is the lowest (6). Shift E was not successfully formed, and it is necessary to work on stabilizing this group.

The results of the study make it possible to reveal factors of closeness of the group of the Bal NPP acting as reasons for mutual selections (see Table 3). As is apparent from the table, the respondents named professional training of the selectee as a definitive reason for mutual selections (mutual exclusions). It is precisely high professionalism which to the greatest degree united the people of different natures; it can be defined as the leading factor for group closeness.

TABLE 3.

Reasons for Mutual Selections for Joint Work	% of Number of Workers Who Made Mutual Selections
Personal qualities	89
Professional training	96
Experience of joint work	82
Social reasons	16
Psychological compatibility	82
Positive public opinion	26
Liability	68

Reasons for Mutual Exclusions in Selection for Joint Work	% of Number of Workers who Made Mutual Exclusions
Personal qualities	69
Weak professional training	74
Negative experience of joint work	63
Social reasons	21
Psychological incompatibility	53
Negative public opinion	21
Unreliability	47

/ 11

The most important factors that determine selections for work under labor conditions were developed professionally important qualities (emotional balance, honesty, conscientiousness and high self control). Almost just as often the reasons for mutual preferences were positive evaluation of the experience of joint work and psychological compatibility. Public opinion on the selectee has a slight influence on group closeness and social reasons even less.

### 6.13. Conflicts.

In the NPP subdivisions sometimes one can observe the emergence of strain and conflicts in business interrelationships. This

mainly occurs between the leaders and subordinates (opinion of 44% of those questioned), between workers of one group (17%), and also between the leaders of the subdivisions and the plant administration (23%). These conflicts are often based on shortcomings in the organization and planning of work (61%), organization of wages, computation of bonuses (63%), absence of sufficient openness (36%), and style and methods of supervising the groups (38%). The conflicts are much less often based on dishonest attitude towards work (opinion of 53% of the respondents), as well as difficulties in interpersonal contact (40%). Apparently the greatest focus is on objective circumstances and not on subjective causes.

#### 6.14. Operation of public organizations.

The role of public organizations is noticeably small in improving SPC. This especially concerns trade union, Komsomol organizations and the sports and technical complex. In the opinion of the absolute majority of those questioned, the role of the professional committee is reduced merely to distributing the deficit. The Komsomol lost the trust of the young people and is not an organization that unites it. The role of the party organization of the BNPP was somewhat activated. This is confirmed by the active participation of communists in the social and political life of the plant and the city.

#### 6.15. Socialist competition.

/12

Existing forms of socialist competition are clearly imperfect. In subdivisions there is "obligation" in accepting socialist commitments. The system of assessment points is artificial. There is no stimulus for victory in competition. With insufficient material incentive there is a complete absence of moral incentive.

In the opinion of 44% of the respondents the administration and the public organizations insist on accepting socialist commitments. The prize for victory in competition entices only 10% of those questioned. Seven percent desired to be the leader of production, 2% (!) desire to obtain public recognition.

It follows from this that neither the administration nor the public organizations were able to organize competition that was interesting to the groups. Today the most effective lever in socialist competition must become material stimulation. But the system of stimulation must be carefully worked out. It must exclude any type of wage-leveling, in principle must not be "little by little, but all." The prize must be a stimulus in work and not an adjunct to wages and this prize should be shared at a common meeting of the group. Only taking of such measures could support in a certain manner the "disappearing" system of socialist competition.

6.16. Study of business and personality qualities of the heads of sections and shops of BNPP.

6.16.1. Study technique.

Assessment of each supervisor was on a 5-point system. The experts were ten people representing the lower, equal and higher positions in relation to the person evaluated. The result is the mean arithmetical of all assessments of the experts on the assessed quality.

6.16.2. Analysis of study results.

The level of manifestation of business and personality qualities of course is individual for each supervisor, however the overall types of managerial activity (scheduling, coordinating and monitoring)

form the general face of a supervisor who, in one way or another, to a certain degree has all (or almost all). The purpose of the study was to reveal precisely the common features in the appearance of the supervisors of BNPP as an integral group.

#### 6.16.3. Knowledge.

13

Highly developed:

- political erudition;
- professional knowledge;
- knowledge of the business, competence;
- knowledge of directive documents regulating the activity of the supervised system;
- knowledge of the latest achievements in equipment and technology of production.

Developed to an insufficient degree:

- knowledge of economics, methods of scheduling and cost accounting;
- knowledge of scientific organization of labor and management;
- knowledge of the socio and psychological fundamentals of management.

#### 6.16.4. Skills and habits.

Highly developed:

- organizational capability;
- personal organization;
- fast reaction to change in situations;
- ability to convince;
- ability to express one's thought clearly and simply;
- business irreproachability of external make-up.

Developed to an insufficient degree:

- personal social activity;

- ability to introduce innovative and progressive ideas;
- ability to work for the future.

#### 6.16.5. Features of character.

##### Highly developed:

- feeling of duty and responsibility;
- principles;
- moral authority (decency, modesty, simplicity);
- humaneness;
- hard-working;
- discipline;
- interest in work;
- exactingness;
- optimism;
- healthy self-love;
- obligingness;

##### Developed to an insufficient degree:

- initiative;
- self criticism.

## 7. Conclusions:

/ 14

### 7.1. Positive experience:

7.1.1. The majority of questioned workers were satisfied with their occupation and work at the nuclear plant;

7.1.2. The overwhelming majority of workers strive for meaningful work that brings satisfaction;

7.1.3. At the nuclear plant among the workers of the labor groups there are informal leaders (groups of leaders), respected and authoritative people capable of rallying the group around themselves;

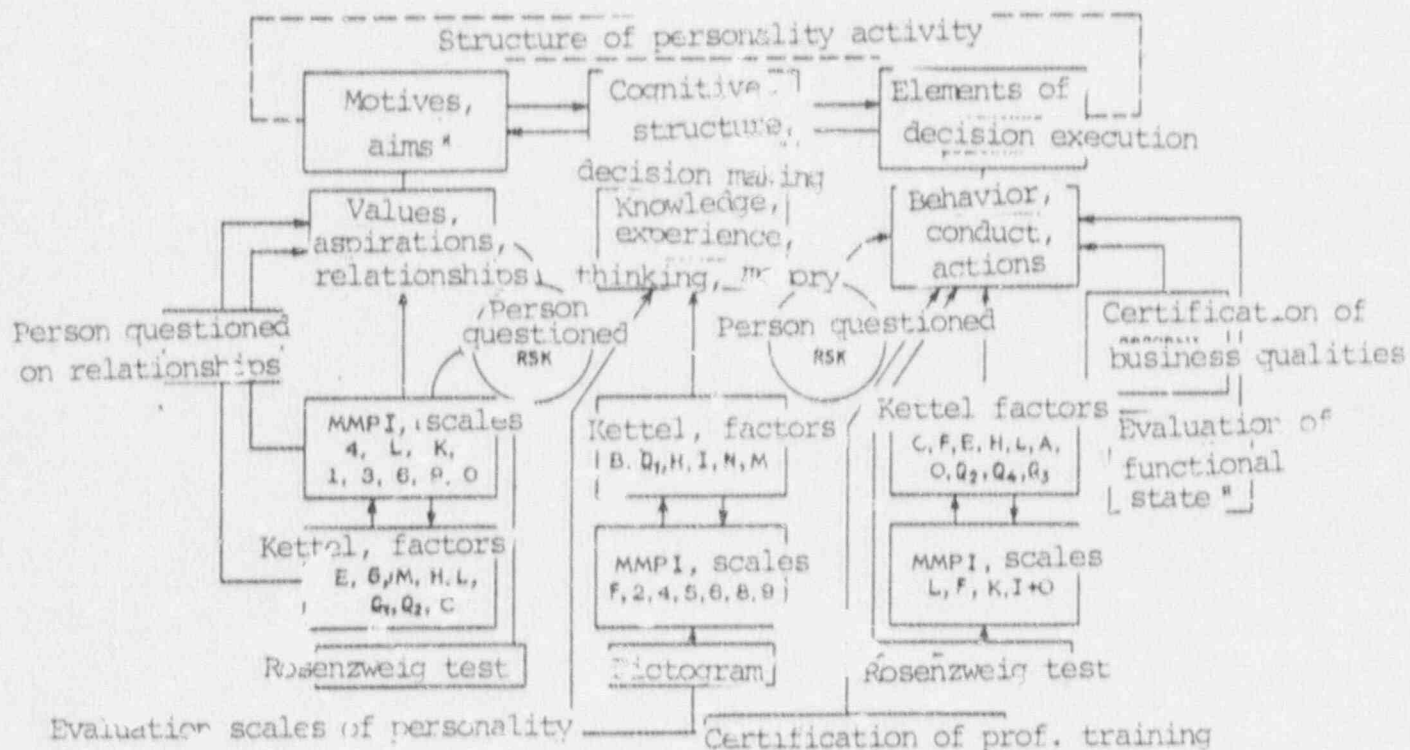


Diagram. Diagram for Use of Testing Data to Assess Personality Qualities According to Structure of Activity of Personality

7.1. problems of the nuclear plant can disturb the main contingent of workers;

7.1.5. At the nuclear plant among the workers of the labor groups there is high educational potential making it possible to solve complicated problems;

7.1.6. In the labor groups there are no group rejections. The rejections present generally concern individual workers;

TABLE. CHANGES IN CORRELATIONS WITH RISE IN HETEROGENEITY OF SAMPLINGS

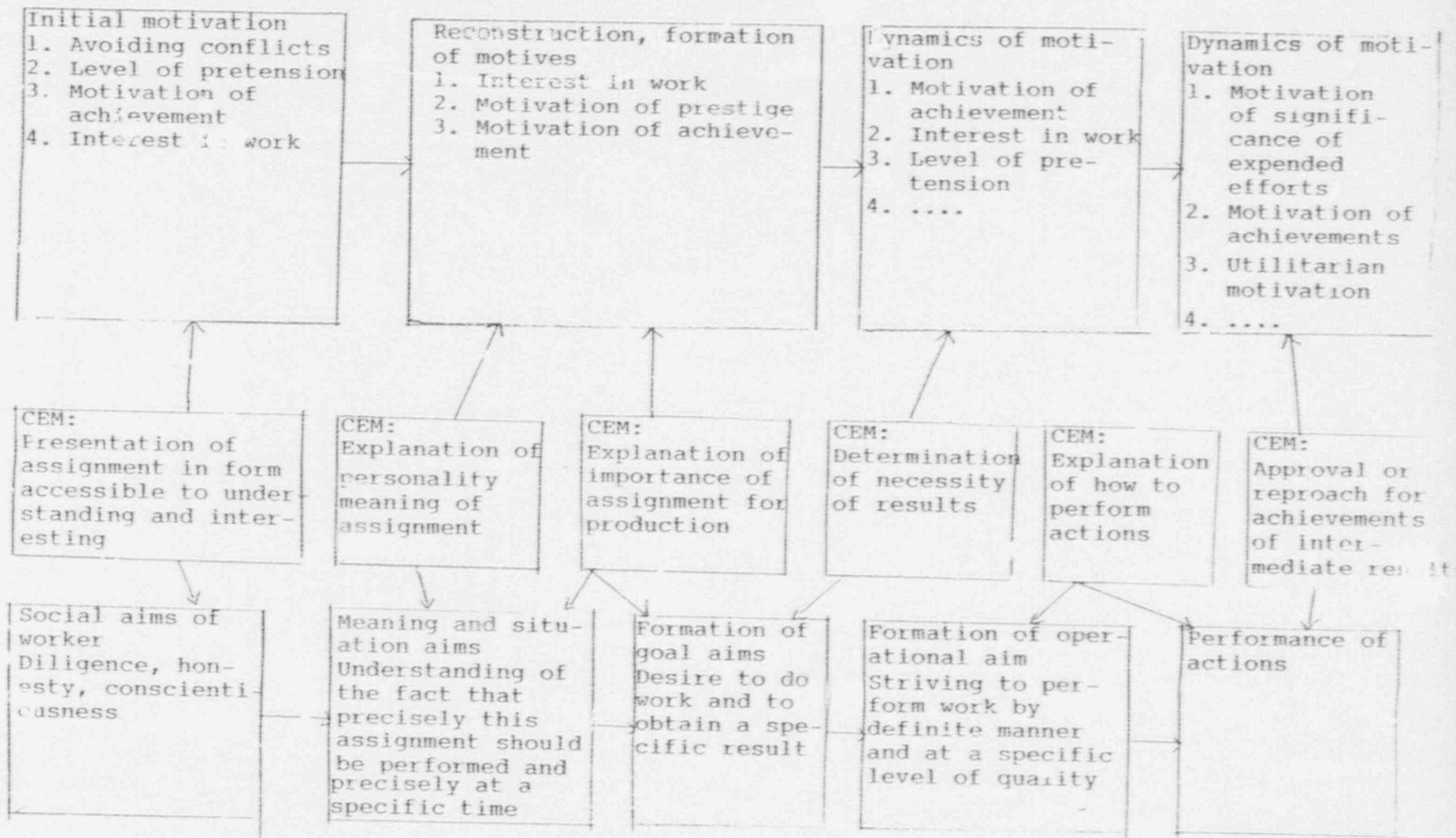
No. of group	Personality factors correlating with business indicators in critical situations***						
	Sampling	Mean point	Test	Gen. charac.	Error-free decis.	Decis. in group	Self-control Pre is. speed of actions
1 Compet. group, 16 people (homog. group)	4.28 ± 0.54	K	-	+H*	+Q <sub>1</sub> *	+N	+H*
			M	-K*	-F*	-1, -3*	-3
2 Operat. person. of SNPP	3.95 ± 0.91	K	-C, +Q <sub>2</sub> , +O	-C	-L, +Q <sub>2</sub>	-A, +Q <sub>2</sub>	-L, +Q <sub>2</sub>
			M	-	+1, +7, +8*	+1*	+1
3 40-man group Operat. person. KNPP, 32 people (heterog. group)	3.55 ± 1.26	K	-L, -Q <sub>1</sub> , -O	+B, -F, -Q <sub>1</sub>	+C, +H,	-B, +N	-
			M	-F, -8 -9, -5	-1, -4 -8, -9	-L, -O +L, +K, -S, -F	-1

\*p ≤ 0.05.

\*\*K by Kettel test, M by MMPI test.

\*\*\*The signs "+" and "-" correspond to positive and negative correlations.

Figure. Control of the Process of Accepting Assignments (CEM-- controlling effect of mentor)



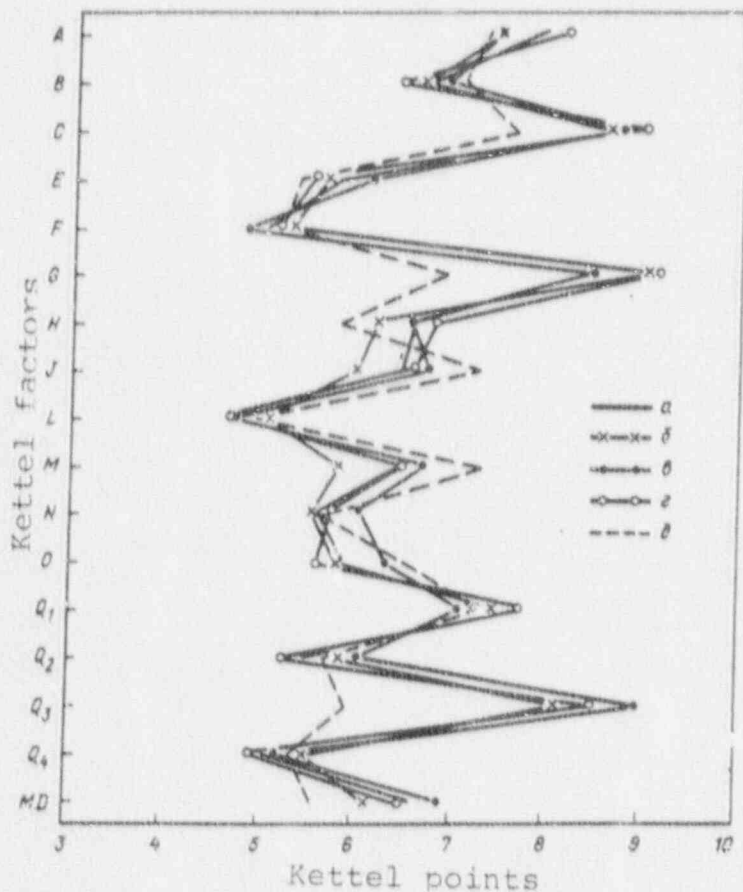


Figure. Generalizing Data of Groups Examined by Kettel Test

Key: Curves

- a. reference of NPP worker
- b. group of KNPP operators
- c. group of "back-up" of department of qualification improvement
- d. group of department of qualification improvement
- e. students of V course

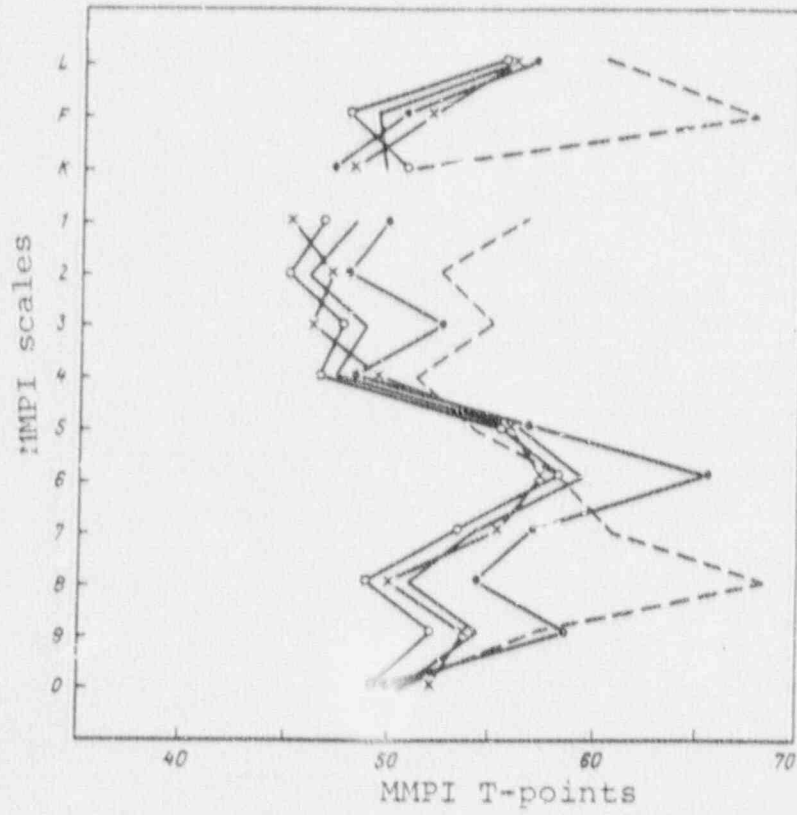


Figure. Generalized Data of Groups Examined by MMPI Test.  
 Designations are the same as in the previous figure.

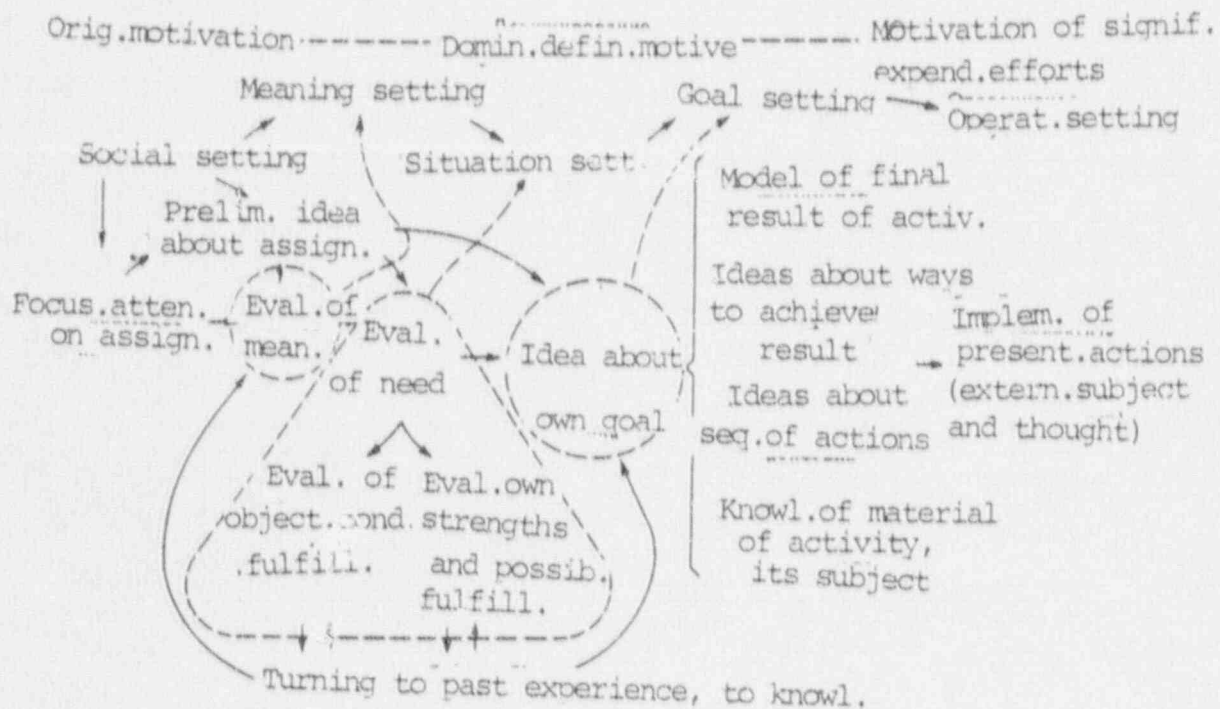


Figure. Stages of Transformation of Instructions to Subjective Role of Worker Actions

7.1.7. The nuclear plant administration by preserving the focus on maintaining precise performance discipling of the personnel strives to expand democratic interrelationships in the labor groups;

7.1.8. The nuclear plant administration is constantly searching for new forms and methods of management and is taking measures to optimize the social and psychological climate in the labor groups;

7.1.9. The fundamental business and personality qualities of the workers of the nuclear plant administration (competence,

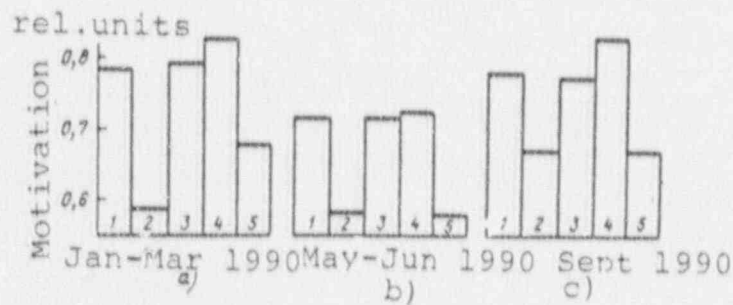


Figure. Change in Motivational Structure of NPP Worker Activity Under Different Working Conditions

Key:

- a. sampling of operational personnel of different NPP
- b, c. sampling of operational personnel of NPP

Types of motives in structure:

1. interest in work
2. avoidance of conflicts
3. level of pretensions
4. prestige of occupation
5. material interest

organizational capabilities, responsibility, discipline and so forth) are developed to a sufficient degree;

7.1.10. Workers of the section of social development of the nuclear plant are highly qualified specialists. The section of social development in its work encompasses different spheres of vital activity of the nuclear plant labor groups;

7.2. At the same time there are a number of problems which

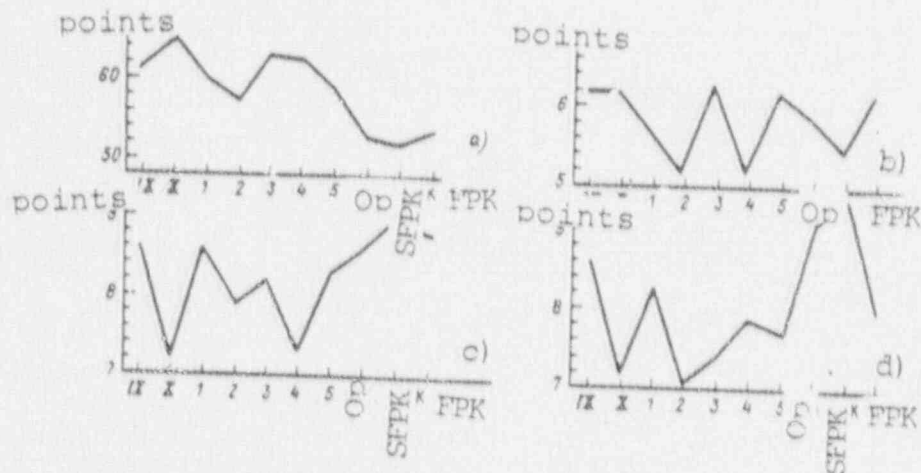


Figure. Graph for Age Changes in Mean Group Indicators

Key:

- a. dynamics of factor 7 (MMPI)
- b. dynamics of factor 0 (16FLO)
- c. dynamics of factor C (16FLO)
- d. dynamics of factor G (16FLO)
- Op. operators
- SFPK. auditors of special faculty ("reserve" group)
- FPK. auditors of the faculty of qualification improvement

those questioned believe have a negative impact on the social and psychological climate in the labor groups, and consequently on the performance efficiency of the subdivisions of the shifts of the nuclear plant:

7.2.1. The existence of organization of labor on the following /15 questions is insufficiently effective;

- scheduling of work and distribution of duties (there is a significant reserve for improving the degree of loading of the personnel);
- interrelationships between the structural subdivisions of the nuclear plant;

7.2.2. The quality of tools and the technological equipment do not meet the requirements of safety;

7.2.3. The problem of selection and placement of personnel has not been completely resolved and the system of improving the qualification of workers needs improvement;

7.2.4. Insufficient level of correspondence of the wages to qualification of the personnel, quantity and quality of expended labor;

7.2.5. Insufficient level of self-organization of the labor groups which is manifest in the condescending attitude toward the workers who violate technology, labor and social discipline;

7.2.6. Low assessment of the activity of public organizations;

7.2.7. Insufficiently developed system of information of the labor groups on questions of the outlook for operation of the nuclear plant, their structural subdivisions under conditions of cost accounting; distribution of goods of elevated demand and housing;

7.2.8. There are no deep and stable relationships in the interpersonal attitudes of the workers;

7.2.9. In the existing form the system of socialist competition does not yield a positive result;

7.2.10. The system of moral and material incentive is not sufficiently developed;

7.2.11. In the labor groups there are workers who do not enjoy the authority and respect of the others;

7.2.12. The leaders of the structural subdivisions have an insufficient level of knowledge of economic methods of management, scientific organization of labor and control, fundamentals of social psychology of controlling labor groups;

7.2.13. Among the leaders of the structural subdivisions in the process of making managerial decisions there is a dominance of operational-tactical methods of control over strategic, as a consequence of which the following are observed in the groups: insufficient ability to work for the future, low degree of initiative, /16

inability to introduce new and progressive ideas into the operation of the nuclear plant equipment.

8. Recommendations:

administration of the nuclear plant:

8.1. Organize training of the operating personnel at the Novovoronezh training center on a specially prepared program coordinated in the production association Soyuzatomtekhnenergo;

8.2. In order to improve the quality of training the personnel accelerate the creation of a study method base of the nuclear plant UTP;

8.3. Involve the most qualified specialists of the nuclear plant and outside organizations in developing programs of training the UTP;

8.4. Examine the workplaces of the personnel for correspondence to the organizational structure of the nuclear plant;

8.5. Review instructions on operation in order to make more specific the actions of the personnel during deviations in work of the equipment. Technical descriptions of the equipment and systems of the nuclear plant should be drawn up with an appendix.

8.6. Verify the content of the points on structural subdivisions of the nuclear plant and duty instructions of the workers for more complete delimitation of the tasks, functions and duties according to the organizational structure of nuclear plants;

8.7. It is expedient to introduce into the indicators of individual bonuses of the personnel an indicator of accident-free operation of equipment regardless of fulfillment of the plan for generation of electricity.

8.8. Introduce into practice mandatory testing periods for individuals advanced to supervisory positions and those rehired for especially important sections of work related to safe and reliable operation of equipment;

8.9. Develop and introduce a technique for correcting the social and psychological climate in the nuclear plant labor groups;

8.10. In forming the shift of the operating personnel take into consideration recommendations of the section of social development;

8.11. Continue the research conducted by the section of social development on personnel topics.